b. Amendments to the Specification

At page 2, after line 29, insert:

In another aspect, an embodiment of an optical modulator includes an interferometer having two optical waveguides with associated cores, a pair of electrodes extending parallel to one of the cores, and a cladding disposed between the one of the cores and the electrodes. The one of the cores has a refractive index that is responsive to applied electric fields. The refractive index of the one of the cores at a wavelength between about 1.3 microns and about 1.7 microns is smaller than the refractive index of the cladding at a microwave's wavelength, a millimeter wave's wavelength, or a submillimeter wave's wavelength. At a microwave's wavelength, a millimeter wave's wavelength, or submillimeter wave's wavelength, the ratio of the refractive index of the one of the cores to the refractive index of the cladding may be less than one.

Between page 12, line 12, and page 13, line 2, rewrite three paragraphs as:

Figure 5A is a cross-sectional view through a portion of the interaction region of an electro-optical modulator 80 with an alternate geometry. The electro-optical modulator 80 includes cladding and core layers 82, 83 and gold electrodes ~~84-86~~ 84, 85, 86. In an exemplary embodiment, core and cladding layers are about 3 microns and about 2-5 microns thick, respectively, and the support 32 is a thick layer of $LiNiO_3$. In the same embodiment, the electrodes ~~84-86~~ 84, 85, 86 are about 25-30 microns thick and separated by lateral gaps of about 30-60 microns.

In this geometry, the optical cladding and core layers 82, 83 are not located between the electrodes ~~84-86~~ 84, 85, 86 for control waveguides. Instead, the electrodes ~~84-86~~ 84, 85, 86 form a stack extending laterally along an outer surface 88 of the cladding layer 82, i.e., a coplanar control waveguide geometry. This alternate geometry concentrates a larger percentage of the energy of control waves in fringe fields than the stripline geometries shown in Figures 1-3.

In the interaction region, two optical waveguides form the arms of a Mach-Zehnder interferometer. The optical waveguides include core regions 90, 92 and adjacent portions of the cladding 82. The two core regions 90, 92 have different placements with respect to electrodes ~~84-86~~ 84, 85, 86, and thus, experience electric fields with different

orientations when control waves propagate in the control waveguide. The core regions 90, 92 have permanent polarizations P, P' whose relative orientations cause electric fields produced by control waves to produce different propagation times for the optical waveguides associated with core region 90 and core region 92, respectively.

At page 13, lines 7 – 18, rewrite the paragraph as:

Figure 5B is a cross-sectional view of the interaction region of another electro-optical modulator 80' with the same control waveguide geometry as the electro-optical modulator 80 of Figure 5A <u>including electrodes 84, 85, 86</u>. The electro-optical modulator 80' also has cladding and core layers 82', 83' with the same composition as the cladding and core layers 82, 83 of the electro-optical modulator 80 of Figure 5A. The electro-optical modulator 80' only has a single core region 90' in the interaction region, because the modulator 80' modulates only the phase of the optical carrier wave. The phase-modulated optical carrier wave is outputted by the electro-optical modulator 80' rather than being interfered with another optical carrier wave to produce an amplitude-modulated optical carrier wave. Thus, the electro-optical modulator 80' is capable of transmitting a phase-modulated optical carrier wave to a distant external receiver (not shown), e.g., by transmission over an optical fiber or through free space.